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ABSTRACT

The purpose of this study was to determine if there were differences in evaluation of an educational interactive video program between high school students and their parents over a 4-year time span. High school students participating in the interactive video program were surveyed during 5 semesters. Survey instruments were also sent to parents via the student. There were 1,024 student respondents and 481 parent respondents. Constructs for each group were determined using exploratory factor analysis. The mean vectors of similar constructs for each status group were contrasted using multivariate analysis of variance (MANCOVA) with semester and site as additional factors. In addition, similar questions for each status group that would not be included in a construct were also contrasted by MANOVA. Because heterogeneity of covariance matrices was not achieved in the initial sample, a stratified random sample of 150 was selected from each site and status group and the analysis repeated. Results indicate there are no differences in evaluation of the interactive video program between parents and students. These results are discussed. (Contains 4 tables and 19 references.) (Author/SLD)

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High School Student - High School Parent:

Are there Differences in Evaluation of an Educational Interactive Video Program?

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Abstract

The purpose of this study was to determine if there were differences in evaluation of an educational interactive video program between high-school students and their parents over a 4-year time span. High school students participating in the interactive video program were survey during 5 semesters. Survey instruments were also sent to parents via the students. There were 1024 student respondents and 481 parent respondents. Constructs for each group were determined using exploratory factor analysis. The mean vector of similar constructs for each status group were contrasted using multivariate analysis of variance (MANOVA) with semester and site as additional factors. In addition, similar questions for each status group that would not included in a construct were also contrasted by MANOVA. Because homogeneity of covariance matrices was not achieved in the initial sample, a stratified random sample of 150 was selected from each site and status group and the analysis repeated. Results indicate there are no differences in evaluation of the interactive video program between parents and students. These results are discussed.

High School Student - High School Parent:
Are there Differences in Evaluation of an Educational Interactive Video Program?

Increased use of interactive video (ITV) for distance learning students has made classes previously inaccessible to rural high school students available locally (Monaghan, 1996). Offering college courses at remote sites by interactive video permits students to take the class without a lengthy drive. In some localities homebound students may now partake of classroom interaction by interactive video. Thus, we may perceive interactive video as a means of providing equal educational opportunities to all students. There are, however, questions concerning this program.

Although interactive video technology has advanced rapidly in recent years, there is increasing evidence that no one technology works in every application (Linking, 1989). In addition, the technology utilized by interactive video requires a different preparation for teaching than traditional methods (Knapczyk, 1993). While the expenditure required for interactive video may be less than providing on site teachers (Morgan, 1994; Villarroel, 1988) or may provide access to equal educational opportunities in rural areas, there is an increasing need for research into and evaluation of the effectiveness of interactive video programs. Evaluation of programs, however can be costly. Although convergent information from different sources provides evidence of validity, if information collected is redundant, the expense of collecting and analyzing data could be used more beneficially.

The primary purpose of this study was to determine if there were differences in the evaluation of an educational interactive video program between participating high school students

and their parents. Yearly results have been utilized to provide improvements to the program. If, however, both parents and students provide the same information, data collection can be limited to only one group.

Literature Review

The basic criterion for distance education is distance between the teacher and the student. Distance education is not new. This technique was begun in the nineteenth century with correspondence education (Klesius, Homan, & Thompson, 1997). It has, however, changed from the correspondence delivery method, through radio methods, to today's computer and interactive video techniques.

Currently, distance education has been used for high school students as an alternative method to earn credentials in the General Education Development (GED) program, to obtain college credits (Green, 1996), or in attempts to revitalize curricular programs (Fucci & Hueston, 1997). Some universities have developed dual degree partnerships with interested businesses to provide on-site, on-demand graduate programs (Haynes & Pouraghabagher, 1997). And, some universities have developed programs to deliver education to rural areas or cultural groups (Monaghan, 1996).

Prior researchers in distance education have investigated student satisfaction, communication techniques, teaching behavior, and change fostered (Moore & Thompson, 1990). Because distance education places students in the situation in which there may be no interaction or association with other students or the teacher, system requirements must be sound (Gunawardena, 1988; as cited in Dillon, Gunawardena, & Parker, 1992). Carter (1997) found that audio was the most important element of interactive education, followed by lighting.

In addition, the importance of the role of the teacher or facilitator has been stressed by several researchers (Garrison & Baynton, 1987 as cited in Dillon, Gunawardena, & Parker, 1992) and interaction with the instructor has been central to the success of a distance education program. When a distance education program has active support, some researchers have found no differences in program rating between home and remote sites. Thyer, Polk, and Gaudin (1997), however, reported that live instruction was rated significantly higher at a college campus than distance learning. They add that distance learning has not yet demonstrated comparable outcomes in terms of student learning.

Developing courses for distance education can be extremely expensive. A properly equipped distance education classroom may cost more than $75,000 (Swift & Wilson, 1997). In addition, there are other costs including instructors training. Although the use of distance education provides the obvious advantage to take otherwise unavailable classes, as the role of distance learning expands, it is essential that the problems unique to this format be examined (Wilson, Litle, Coleman, & Gallagher, 1997/98). How do programs change over time? What do students perceive as advantages and disadvantages of the distance education program? What do parents perceive as advantages and disadvantages? Should information be collected from all stakeholders?

The current study sought to answer questions concerning information collection. Of prime concern was to determine if there were differences in evaluation of the ITV program between parents and students. In addition to this omnibus question, however, we sought to determine if site or semester interacted with parent-student status providing differences in response.

Method

Subjects

High school students enrolled in an interactive video class at a facility in a rural Applachian area during the Spring semesters of 1995, 1996, 1997, and 1998 and the Fall semester 1997 were surveyed. Surveys were administered during the regularly scheduled class time by the class instructor or remote facilitator. In addition, similar questionnaires were sent to the parents via the students.

Measurement

The original survey instrument consisted of demographic information (school, gender, grade, etc.), some 5-point Likert style questions, and three open-ended questions concerning strengths, weaknesses, and suggested improvements for the interactive video program. The Likert style questions were used for this analysis.

Responses to the Likert-style questions ranged from 1 (Strongly agree) to 5 (Strongly disagree) and a non-applicable category. Some Likert-type questions were negatively stated in the questionnaire. Negatively stated questions (negative toward the ITV program) were reverse coded for this analysis. The non-applicable category was treated as missing data.

Analysis

Exploratory factor analysis for each status group was used to determine basic constructs to be investigated. Because student questionnaires contained 35 Likert-type questions and parent questionnaires contained 30 questions, there were different numbers of questions loading on each construct for each group. Coefficient alpha was determined for each construct for each group. If coefficient alpha for a construct was less than 0.6, the construct was considered to be unreliable

and was not included as a construct.

Student and parent constructs were then compared visually to determine if they contained similar questions. If questions on a construct did not match similar questions from the other group, that construct was eliminated. Six student constructs corresponded to parent constructs. A mean score for each of these constructs was determined for each respondent. Student questions not included in a construct corresponding to a parent construct but had a matching question on the parent questionnaire were analyzed separately.

Constructs were analyzed using multivariate analysis of variance (MANOVA). When multivariate significance ($p \leq .05$) was detected, the mean vector was further analyzed by considering the proportion of variance explained. If status, the interaction of status and site or the interaction of status and semester contributed to multivariate significance and explained over 5% of the variance in the mean vector, each construct was examined univariately. If a construct was significantly different ($p < .05$) by status or either of the status interactions and 5% of the difference in the construct was explained by status or the status interactions, each question loading on this construct was analyzed as an individual dependent variable. In addition, questions not included in a construct but having a matching question in the other group were analyzed by MANOVA.

Results and Discussion

There were 1505 respondents (students = 1024; parents=481) included in this comparison for the four survey years (5 semesters) in this analysis. Exploratory factor analysis yielded 6 in-common constructs for the parent and student questionnaires. Each construct had a reliability greater than 0.6 for their group (see Table 1).

Insert Table 1 About Here

A mean was determined for each respondent for each construct (see Table 2). In addition, 5 questions were similar for the respondent groups. Although 3 parent questions and 4 student questions appeared to be similar, the wording of the questions prevented their comparison (see Table 3).

Insert Tables 2 and 3 About Here

Initial analysis of the 6 in-common constructs resulted in a statistically significant difference ($F=3.82$, $df=6, 1436$, $p<.01$) in mean vector between students and parents. Less than 2% ($\eta^2 =.016$) of the variance in mean vectors, however, was accounted for by differences in status group. In addition, equality of covariance matrices was not achieved. Consequently, a stratified random sample of 600 respondents (300 students, 300 parents) equally distributed between home and remote sites was selected. The analysis was again conducted yielding a non-significant F ratio of 1.28 ($df=6, 550$, $p>.05$). Status accounted for 1.4% of the variance in this analysis. In both instances less than 2% of the variance in mean vector was explained .

Because equality of covariance matrices was not achieved initially, all further analyses were conducted on the full sample as well as the reduced number. Although it would have been preferable to have conducted the analysis using a MANOVA which included status, site, and semester concurrently, this was not done due to the disparity in cell sizes. Consequently, multiple

analyses were conducted. Construct means were first contrasted by site and status and then contrasted by semester and status. Then the 5 in-common questions were contrasted by site and status. This was followed by a contrast of these 5 questions by semester and status.

Yearly analyses had yielded statistically significant differences between sites for both status groups. It was not surprising, therefore, to find significant differences by site ($F=45.1$, $df=6, 550$, $p<.01$). Site accounted 33% of the variance in the constructs. The primary concern with this analysis, however, was to determine if there were interaction effects between site and status group. There was also a significant interaction effect ($F=2.43$, $df= 6, 550$, $p< .03$). Although statistically significant, the interaction between site and status accounted less than 3% of the variance in constructs (see Table 4).

Insert Table 4 About Here

Constructs were also contrasted by status and semester using the full and the reduced sample. Statistically significant main effects of status, semester, and the interaction of status and semester were detected. None of these effects accounted for 2% of the variance in constructs (see Table 4).

The analysis was then conducted to determine if there were differences between the 5 in-common questions which could not be included in similar constructs. There were statistically significant differences in the reduced sample mean vector ($F=2.3$, $df=5, 528$, $p<.05$) between students and parents explaining 2.1% of the variance. Similar results were obtained from the full sample ($F=4.86$, $df= 5, 1351$, $p < .01$; $\eta^2=.018$) and when status was contrasted with semester

(see Table 4). There was no statistically significant interaction effect between status and site (variance accounted for < 2%) or status and semester (variance accounted for <1%).

Two groups of questions were not contrasted. Some parent questions were worded in a different manner than students. For example, parents received the statement, 'Study is the same for ITV as for traditional classes'. Students received statements such as, 'I study for ITV' and 'I study for traditional classes'. In this instance, the parent questions were questionable.

Conclusion

Although statistically significant differences were detected between parents and students, status did not account for 5% of the variance. This suggests that this portion of the questionnaire is providing similar information from parents and students. In addition, the statistically significant interaction effects between status and site and between status and semester did not account for 5% of the variance. Thus, it was concluded that collecting both parent and student information is redundant.

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Table 1

Reliability and Questions included for Factors by Status

	Question Included		Reliability (Coef Alpha	
	Parent	Student	Parent	Student
ITV Evaluation			0.77	0.89
ITV Good Addition Curric	✓	✓		
Par ITV good addition		✓		
Hestitate Take Another ITV	✓	✓		
Choice - ITV Class	✓	✓		
ITV Good Way Offer Class	✓	✓		
Take Coll course on ITV	✓	✓		
Better Listener	✓	✓		
Teacher Interaction			0.8	0.83
ITV teacher knows me	✓	✓		
Can Hear Teacher	✓	✓		
Can Ask Quest	✓	✓		
Teacher hears me	✓	✓		
Talk to Teach as needed	✓	✓		
Materials Support			0.64	0.68
Class materials timely	✓	✓		
Returned Work	✓	✓		
Teacher Remote as Needed	✓			
Cheating			0.65	0.67
Cheating Trad Classes		✓		
Easier Cheat Remote	✓	✓		
Easier Cheat Home		✓		
Poor Behav ITV	✓	✓		
Obs Cheating ITV	✓	✓		
Environment			0.6	0.65
Amt Desk Space	✓	✓		
Clear sight TV	✓	✓		
Attractive Classroom		✓		
See materials on syst	✓	✓		
Audio			0.79	0.8
Hear Students other sites	✓	✓		
Hear Quest other Sites	✓	✓		

Table 2

Factor and Question Means by Status

Factor/ Category	Question	Factor Means		Question Means	
		Parent	Student	Parent	Student
ITV Evaluation		2.53	2.5		
	ITV Good Addition Curric			2.23	2.27
	Par ITV good addition				2.5
	Hestitate Take Another ITV			2.6	2.54
	Choice - ITV Class			3.12	2.97
	ITV Good Way Offer Class			2.08	2.1
	Take Coll course on ITV			2.45	2.47
	Better Listener			2.63	2.75
Teacher Interaction		1.9	1.95		
	ITV teacher knows me			3.2	2.2
	Can Hear Teacher			2.61	2.05
	Can Ask Quest			2.23	1.93
	Teacher hears me			2.66	2.19
	Talk to Teach as needed			1.72	1.95
Materials Support		2.07	1.99		
	Class materials timely			1.79	2.02
	Returned Work			2.09	2.01
	Teacher Remote as Needed			3.35	
Cheating		2.81	2.75		
	Cheating Trad Classes				3.32
	Easier Cheat Remote			3.03	3.24
	Easier Cheat Home				2.29
	Poor Behav ITV			2.96	2.6
	Obs Cheating ITV			2.64	2.62
Environment		1.75	1.78		
	Amt Desk Space			1.81	1.61
	Clear sight TV			1.8	1.53
	Attractive Classroom				2.45
	See materials on syst			1.65	1.87
Audio		2.18	2.33		
	Hear Students other sites			2.18	2.27
	Hear Quest other Sites			2.2	2.37

Table 3

Question Means by Status (questions not loading on a factor)

Category	Question	Question Means	
		Parent	Student
Matched Questions			
	Limit ITV affect Grade	2.89	2.78
	Know Stud Other Schl	2.67	2.67
	Meet Other Schl Stu more often	2.42	2.23
	Most Talk by Homesite	3.05	3.25
	ITV Courses Difficult	2.93	2.79
	Trad Courses Difficult		2.84
Unmatched Questions			
	Tchr attn same home and remote	2.5	
	Tchr attn home site		3.37
	Tchr attn remote site		2.37
	Study for ITV		2.65
	Study for Trad Class		2.43
	More Study ITV	2.8	
	Study Same ITV	2.34	

Table 4

Tests of Statistical Significance and Variance Explained

		Equal Size Groups		Total Sample	
Model	Effect	F[a]	Eta^2	F[a]	Eta^2
Constructs					
1	Status	1.28	.014	3.98**	.016
	Site	45.10**	.330	94.46**	.284
	Status/Site	2.44	.026	3.22**	.013
2	Status	1.59	.017	3.76**	.016
	Semester	1.77*	.019	3.33**	.014
	Status/Semester	1.51	.016	2.13**	.009
Questions					
3	Status	2.30*	.021	4.86**	.018
	Site	3.42**	.031	6.55**	.024
	Status/Site	2.13	.020	2.11	.008
4	Status	2.03	.019	3.08**	.011
	Semester	1.90**	.018	2.99**	.011
	Status/Semester	.79	.007	.89	.003

Note. [a] As measured by Wilks' Lambda. *p≤ .05. **p≤ .01.